

## CLAIMS

### WHAT IS CLAIMED IS:

1. A method for defining hardware routing paths in a network having IP paths and MPLS paths, the method comprising:

5                assigning a path ID for each path within a path group, the path ID for each path comprising an IP address, wherein the path group contains IP paths, MPLS paths, or both IP and MPLS paths;

              comparing all path IDs in each path group; and

10              assigning a common hardware resource to groups having matching path IDs.

2. The method of claim 1 wherein assigning a path ID for each IP path comprises assigning a unicast IP address.

15              3. The method of claim 2 wherein the unicast IP address corresponds to the IP path's next hop IP address.

4. The method of claim 2 wherein assigning a path ID for each MPLS path comprises assigning a unique IP multicast address.

5 5. The method of claim 4 wherein assigning a unique IP multicast address comprises assigning a unique IP address from an internal managed group of IDs.

6. The method of claim 5 wherein the internal managed group of IDs is sufficiently large to represent all network hardware paths.

10 7. The method of claim 5 wherein assigning a unique IP address comprises assigning a unique IP address for each software MPLS path entity.

15 8. The method of claim 7 further comprising returning an assigned unique IP address to the group of internal managed IDs when a path entity is deleted.

9. The method of claim 1 further comprising sorting the paths in each of the path groups.

10. The method of claim 9 wherein sorting the paths comprises sorting the paths by the value of the path ID.

11. The method of claim 1 further comprising building a database  
5 containing all path groups and using the database to compare the group paths.

12. A system for defining hardware routing paths in a network having IP paths and MPLS paths, the system comprising:

a processor operable to assign a path ID for each path within a path group, the path ID for each path comprising an IP address, compare all path IDs in each path group, and assign a common hardware resource to groups having matching path IDs, wherein the path group contains IP paths, MPLS paths, or both IP and  
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MPLS paths; and

memory for storing the path IDs.

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13. The system of claim 12 wherein the path IDs assigned for IP paths comprise unicast IP addresses.

14. The system of claim 12 wherein the path IDs assigned for MPLS paths comprise unique IP multicast addresses.

5           15. The system of claim 12 wherein the path IDs assigned for MPLS paths comprise broadcast IP addresses of form 255.x.x.x.

10           16. The system of claim 12 further comprising a database of multicast IP addresses sufficiently large to represent all network hardware paths.

15           17. A computer program product for defining hardware routing paths in a network having IP paths and MPLS paths, the product comprising:

code that assigns a path ID for each path within a path group, the path ID for each path comprising an IP address, wherein the path group contains all IP paths, all MPLS paths or both IP and MPLS paths;

15           code that compares all path IDs in each path group;

code that assigns a common hardware resource to groups having matching path IDs; and

a computer-readable storage medium for storing the codes.